

salt. A plurality of bipolar electrode plates is mounted in the cell with only a select number of electrodes being connectable to a power supply.

Yet another system is described in WO 94/00860 where an electrolytic filter has electrically configurable connections to active electrodes in an electrolytic cell. A sensor senses a resistivity variation in the electrolytic solution and a control circuit varies the current flow by adjusting the separation between electrodes using relay contact switches for electrically connecting or disconnecting each active electrode.

A major drawback of the above systems is they are designed for a specific electrolyte or liquid which is to be treated. The electrodes used, their quantity and desired power requirements are specific to the liquid being treated.

A further drawback of conventional electrocoagulation systems is the high cost associated with designing a system for each specific application. Substantial testing and modification is required where the liquid stream changes in its concentration of contaminants.

Object of the invention

It is an object of the invention to provide an improved electrocoagulation system.

It is a further object of the invention to provide an improved control assembly for an electrocoagulation cell that facilitates treatment of various liquids or species.

Summary of the invention

In one form, although it need not be the only or indeed the broadest form, the invention resides in a control assembly for an electrocoagulation cell comprising:

- (i) a plurality of electrodes;
- (ii) releasable connection means between at least a selection of

the electrodes; and

- (iii) electrical connection means attached to the releasable connection means which in use is connectable to a power supply.

5 The releasable connection means may facilitate the number of electrodes releasably connected to be varied according to specific requirements for treating a particular electrolyte.

The releasable connection means may include a busbar received in a slot, notch or aperture in each of said selection of the plurality of electrodes.

10 The electrodes may be connected in a series arrangement.

The electrocoagulation cell can treat the electrolyte at a rate of 1 Litre per minute or 5 Litres per minute or 10 Litres per minute or 100 Litres per minute or 500 Litres per minute (LPM).

15 In another aspect of the invention there is provided an electrocoagulation system comprising:

- (i) a plurality of electrodes;
 - (ii) an electrolytic cell having an internal chamber which contains the plurality of electrodes; and
 - (iii) a power supply connectable to a power source and also
- 20 connectable to the electrodes said power supply having control means for providing a selected constant output current or selected constant output voltage whereby the electrolytic cell may process samples of varying characteristics.

25 In a first embodiment the control means may comprise a variac which may be connected to the electrocoagulation cell by a rectifier to provide the selected DC current or voltage of constant value. The variac may also be connected to another transformer if required. In this embodiment the power supply to the cell may also include a reverse polarity timer and a forward polarity timer.

30 In a second embodiment there may be provided:

- (i) an adjustable switch connectable to a power source;

- (ii) a voltage regulator connected to the switch;
- (iii) a transformer having a primary coil connected to the voltage regulator;
- (iv) a rectifier connected to a secondary coil of the transformer and;
- (v) said control means being connected between the switch and the voltage regulator to control a DC output applied to the electrolytic cell to have said selected constant current or said selected constant voltage.

10 In the second embodiment the control means may comprise a voltage or current potentiometer or more preferably a digital potentiometer which allows for either of voltage or current to be maintained at a constant value.

15 The electrocoagulation system may also include a programmable logic control (PLC) for checking parameters associated with the flow of an electrolyte to and through the cell.

There also may be provided flow control means for delivering the electrolyte to the electrocoagulation cell.

20 In a preferred form of the invention, the flow control means includes a digital controller, variable AC motor drive, feed pump with pump motor and a flow transmitter.

The power supply may be connected to a three phase AC power source.

25 Preferably, the constant output current and the constant output voltage is a direct current (DC).

Preferably, if a constant output current is selected, then the DC current is maintained constant with respect to a reference set by the control means and the DC voltage may vary.

30 Preferably, if a constant output voltage is selected, then the DC voltage is maintained constant with respect to a reference set by the control means and the DC current may vary.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A control assembly for an electrocoagulation cell comprising:
 - (iv) a plurality of electrodes;
 - (v) releasable connection means between at least a selection of
5 the electrodes; and
 - (vi) electrical connection means attached to the releasable
connection means which in use is connectable to a power
supply.
2. A control assembly as claimed in claim 1 wherein the releasable
10 connection means is a rod which extends between a slot, aperture or notch
of said at least a selection of the electrodes.
3. A control assembly as claimed in claim 2 or 3 wherein the rod is a
threaded rod and is attached to an associated electrode by one or more
threaded fasteners.
- 15 4. A control assembly as claimed in claim 3 wherein the threaded
fastener(s) comprise one or more nuts each having an associated washer.
5. A control assembly as claimed in any one of claims 2 to 4 wherein
each electrode has one or more upwardly extending tabs wherein each tab
includes said slot, aperture or notch.
- 20 6. A control assembly as claimed in any preceding claim wherein the
electrical connection means comprises a power lead secured to a conductor
having an aperture for engaging with an adjacent end of the attachment rod.
7. A control assembly as claimed in claim 6 wherein each electrical
connector is attached to the attachment rod with a fastener on either side of

the connector.

8. An electrocoagulation cell which includes the control assembly of any preceding claim.

9. An electrocoagulation system comprising:

- 5 (iv) a plurality of electrodes;
- (v) an electrolytic cell having an internal chamber which contains the plurality of electrodes; and
- (vi) a power supply connectable to a power source and also connectable to the electrodes said power supply having control means for providing a selected constant output current or selected constant output voltage whereby the electrolytic cell may process samples of varying characteristics.

10. A electrocoagulation system as claimed in claim 9 wherein there is provided said control means comprises a variac connected to the power source through a switch means and also connected to the electrolytic cell by a rectifier to provide a DC voltage to the electrolytic cell.

11. An electrocoagulation system as claimed in claim 10 wherein there is provided a transformer which is interposed between the variac and the rectifier.

12. An electrocoagulation system as claimed in claim 11 wherein the power supply also includes a reverse polarity timer and a forward polarity timer.

13. An electrocoagulation system as claimed in claim 9 which comprises:

- (vi) an adjustable switch connectable to a power source;
- 25 (vii) a voltage regulator connected to the switch;
- (viii) a transformer having a primary coil connected to the voltage regulator;
- (ix) a rectifier connected to a secondary coil of the transformer and;
- 30 (x) said control means being connected between the switch and the voltage regulator to control a DC output applied to the electrolytic cell to have said selected constant current or said

selected constant voltage.

14. A power supply as claimed in claim 13 which further includes a polarity switch relay to select an output polarity.

5 15. A power supply as claimed in claim 13 or 14 which further includes a voltage or current regulator which receives an output from the rectifier and together with said control means effects a firing control of the voltage regulator.

16. A power supply as claimed in any one of claims 13 to 15 wherein said control means includes a voltage and current potentiometer.

10 17. A power supply as claimed in any one of claims 13 to 16 which further includes a current trip for protection against exceeding a maximum DC amperage rating of the power supply.

18. A power supply as claimed in any one of claims 13 to 17 which further includes an over temperature relay to sense any overheating in the rectifier.

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